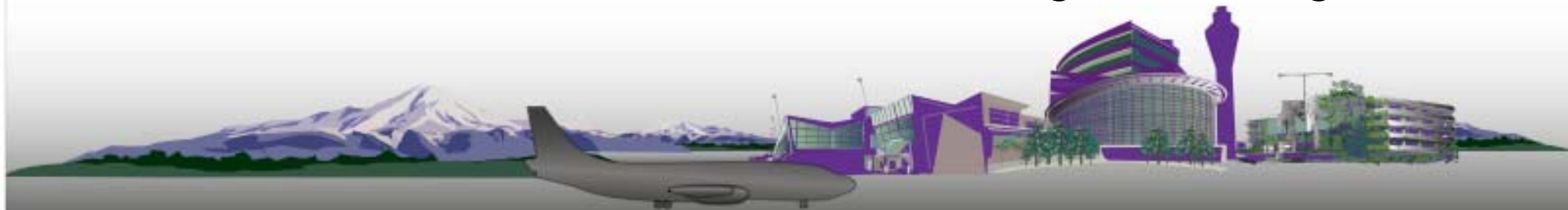


# Port of Seattle Aviation Division

## Greenhouse Gas Emissions Inventorying

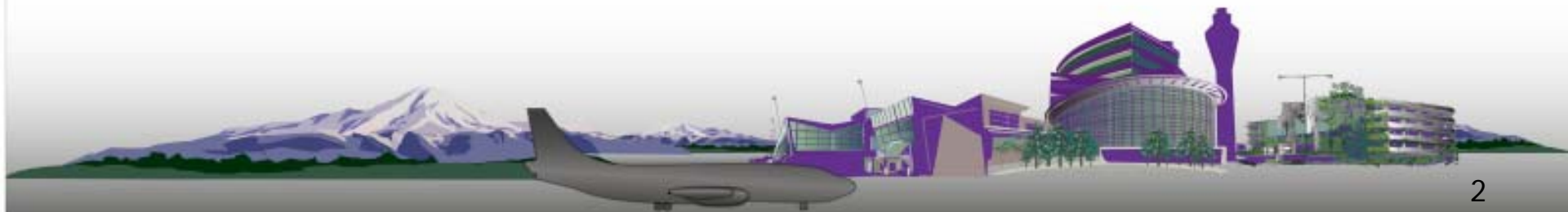
Presented to the  
Creating Cooler Communities Conference  
April 16, 2008

Russ Simonson, Sr. Environmental Program Manager



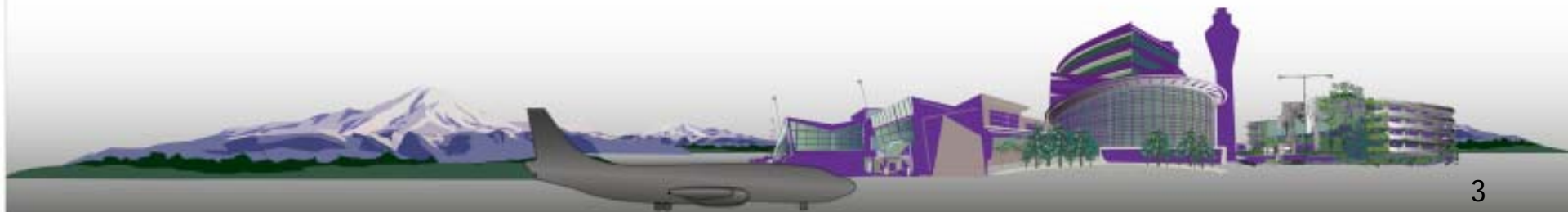
# Topics

- Emissions Inventory Boundaries
- Methods to Quantify Emissions
- 2006 Inventory
- Next Steps



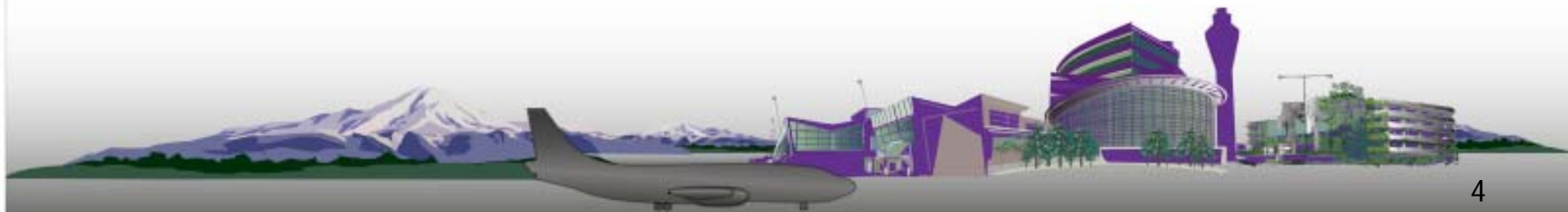
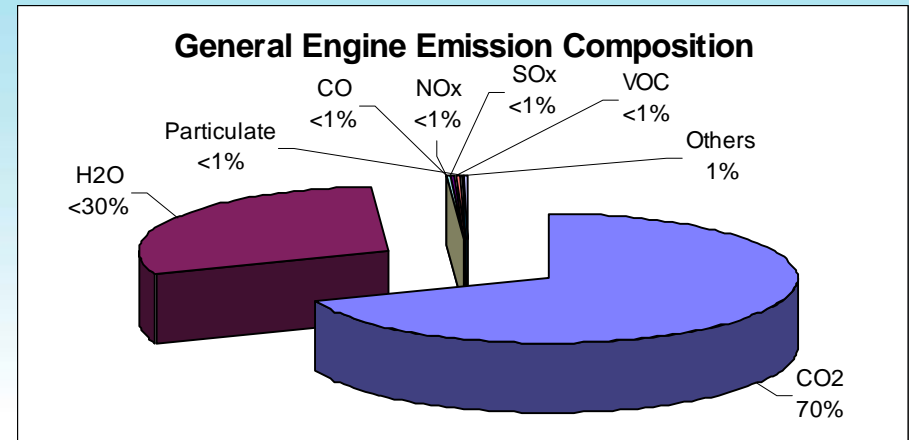
# Sources of Airport Greenhouse Gases

- Aircraft
- Ground Support Equipment (GSE)
- Ground Access Vehicles (GAV)
- Airport Infrastructure and Stationary Sources
- Industrial Activities
- Construction Activities



# Aviation Greenhouse Gas Emissions

- Aircraft produce the same types of emissions as cars and trucks.
- Aircraft engine emissions:
  - 70% CO<sub>2</sub>,
  - < 30% H<sub>2</sub>O, and
  - < 1% each of NO<sub>x</sub>/N<sub>2</sub>O, CO, SO<sub>x</sub>, VOC, PM, others



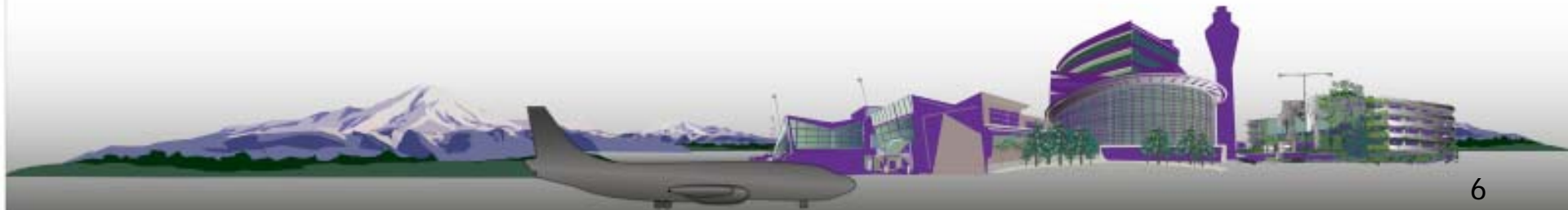
# Inventory Process

- Airport protocol has been developed for **criteria pollutants** (ozone, carbon monoxide, particulate matter, etc)
- For greenhouse gases there are many protocols – none focused on airports:
  - Intergovernmental Panel on Climate Change (IPCC)
  - USEPA
  - World Resource Institute (WRI)
  - International Council of Local Environmental Initiatives (ICLEI)
- Sea-Tac is one of the first airports to create a detailed greenhouse gas inventory



# Aviation Division Emissions Protocol

- Use IPCC, EPA, WRI, ICLEI
- Organizational boundaries
- Operational boundaries
  - **Direct**: emissions owned and controlled by the party (boiler, vehicles, etc)
  - **Indirect and Optional**: consequence of the activities of the party, but occur at sources owned or controlled by another entity



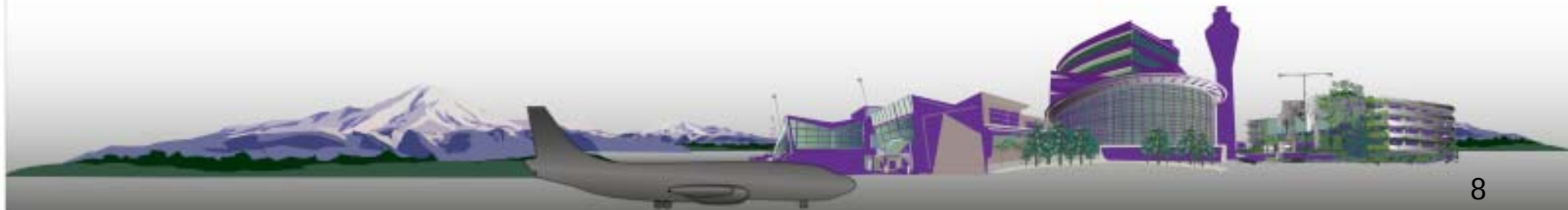
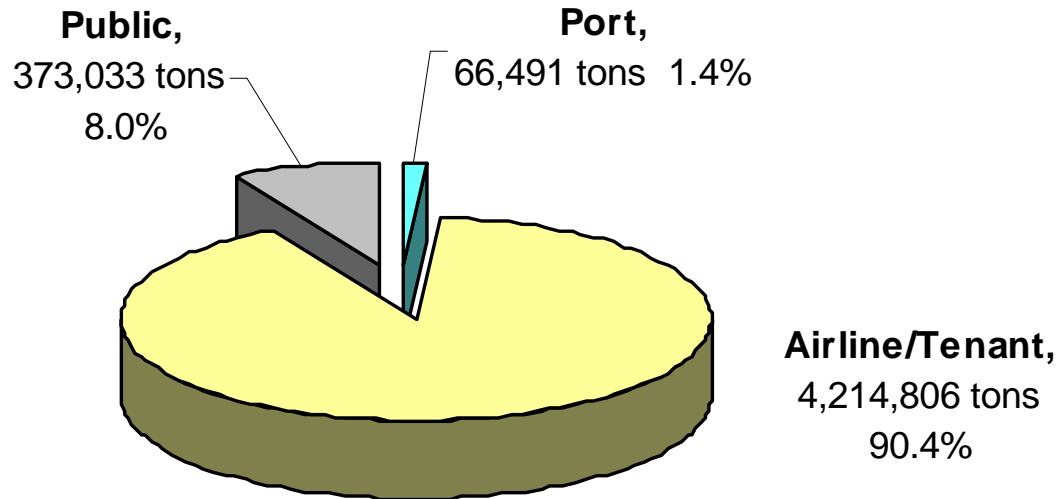
# Aviation Division Emissions Protocol

- Direct (Port-owned and controlled)
  - Power/energy associated with Port buildings
  - Port-owned service equipment (GSE)
  - On-airport roadway travel (GAV)
- Indirect and Optional
  - Airline's Aircraft operations
  - Tenant-owned equipment use (GSE, GAV)
  - Public transportation (GAV)



# Total Direct, Indirect, and Optional

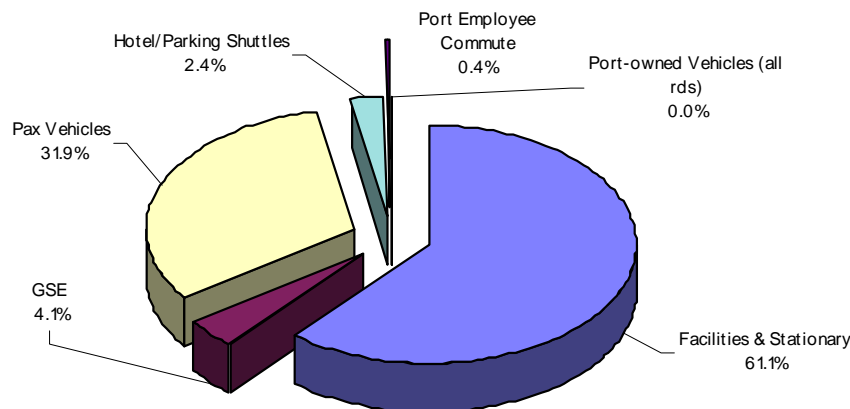
## Distribution of Ownership/Control (4,654,330 tons of CO2 in 2006)



# Port-Owned/Controlled Emissions

- 1.4% of total – 66,491 tons of CO<sub>2</sub>
- Key sources:
  - Facilities (electrical/natural gas) – 61.1%
  - Passenger vehicles on airport – 31.9%
  - Port service vehicles (GSE) – 4.1%
  - Hotel & Parking Shuttles – 2.4%

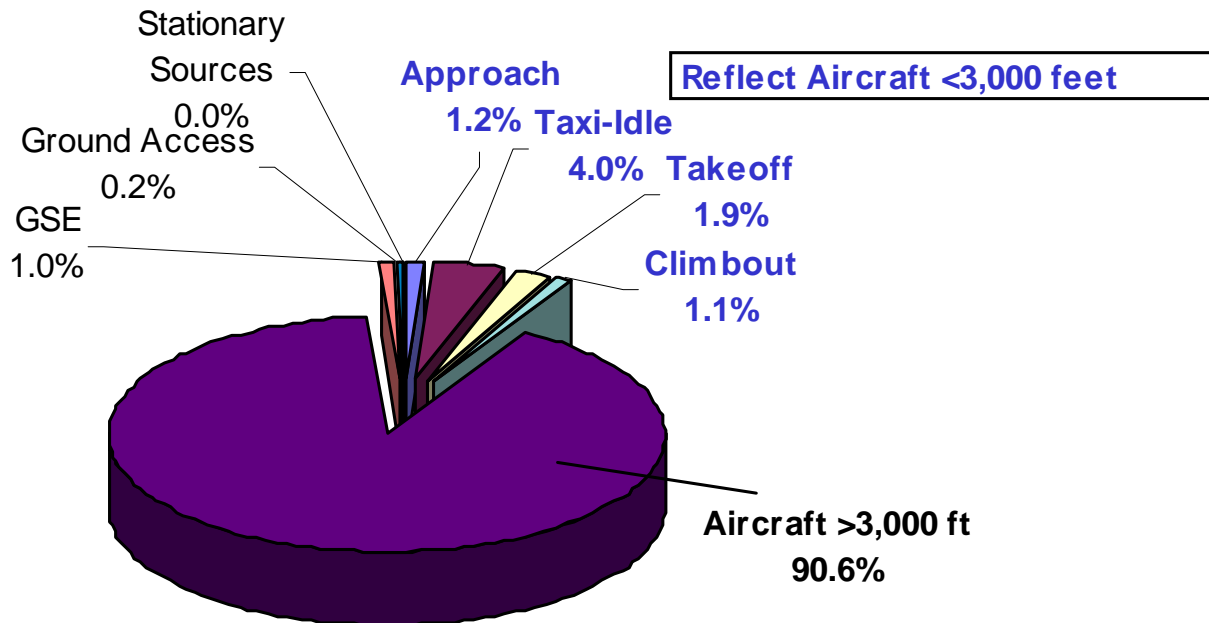
**Port of Seattle Aviation Division  
2006 CO<sub>2</sub> Emissions (66,491 tons)**



# Airline/Tenant Owned/Controlled Emissions

- 90.6% of total – 4,214,806 tons CO<sub>2</sub>
- Key Source:
  - Aircraft 99% (most are above 3,000 feet)

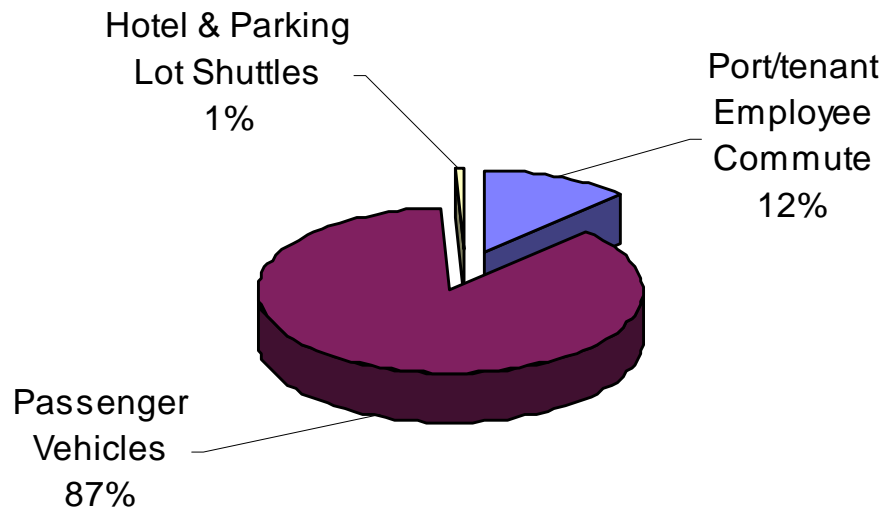
## Airline-Tenant Owned-Controlled 2006 CO<sub>2</sub> Emissions (4,214,806 tons)



# Public Owned/Controlled Emissions

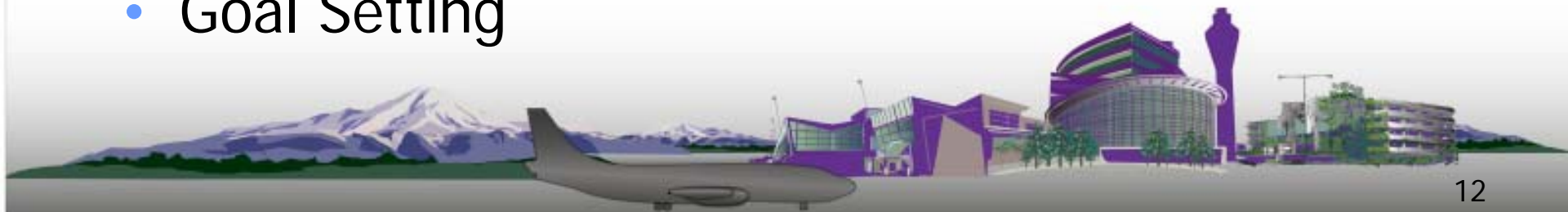
- 8.0% of total – 373,033 tons of CO<sub>2</sub>
- Key Sources (off-airport travel):
  - Passenger Vehicles – 87%
  - Employee commute – 12%

**Public Owned-Controlled 2006 CO<sub>2</sub> Emissions**  
(373,033 tons)

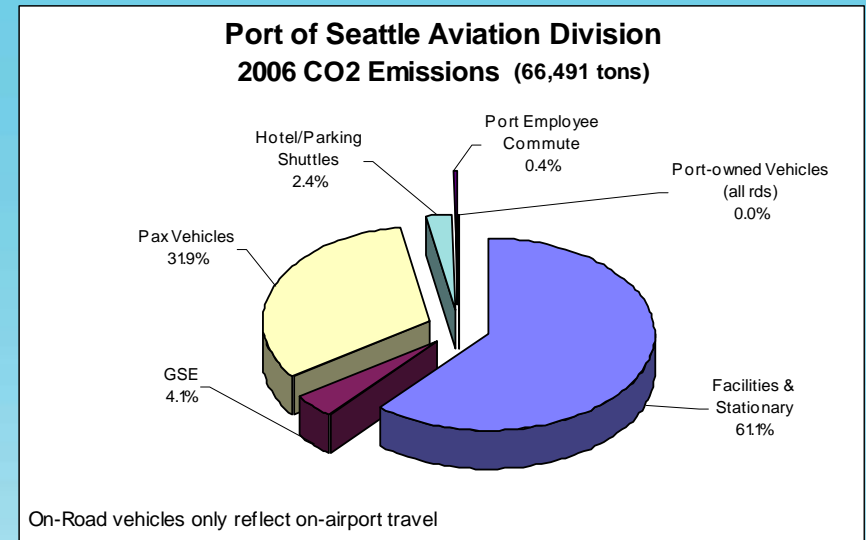


# Next Steps - Future Actions

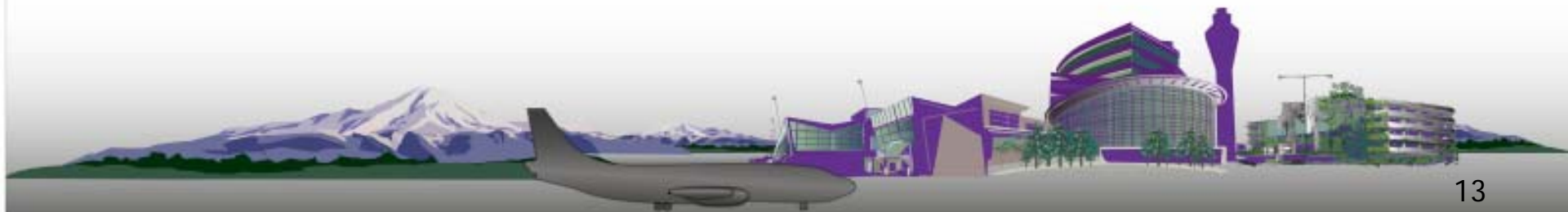
- Identify emission reduction possibilities
  - Focus on key sources
  - Identify fuel efficiencies and emission reduction opportunities
- Improve emissions inventory
  - Industry progress on quantification tools
  - Account for benefit of environmental programs
- Goal Setting



# Port of Seattle Operations Emission Reduction Opportunities

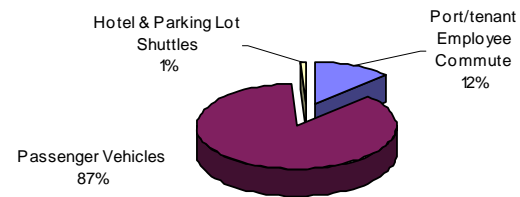


- Hotel Courtesy Van Consolidation
- Ultra Green Fleet Program
- Widen Building Comfort Zone
- Garage Way Finding
- LED lighting

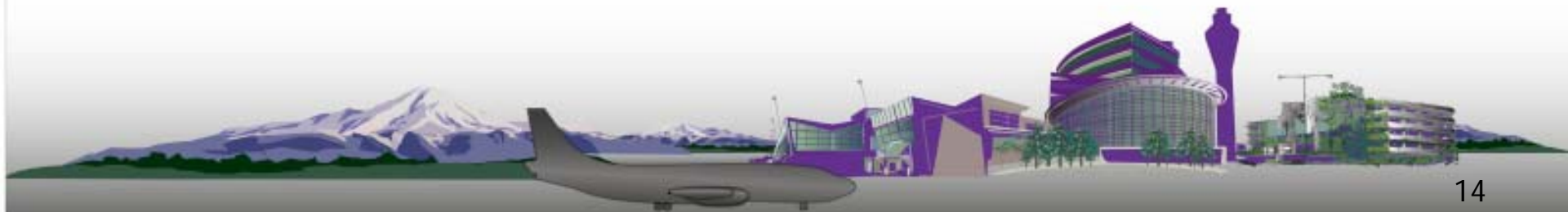


# Public Operations Emission Reduction Opportunities

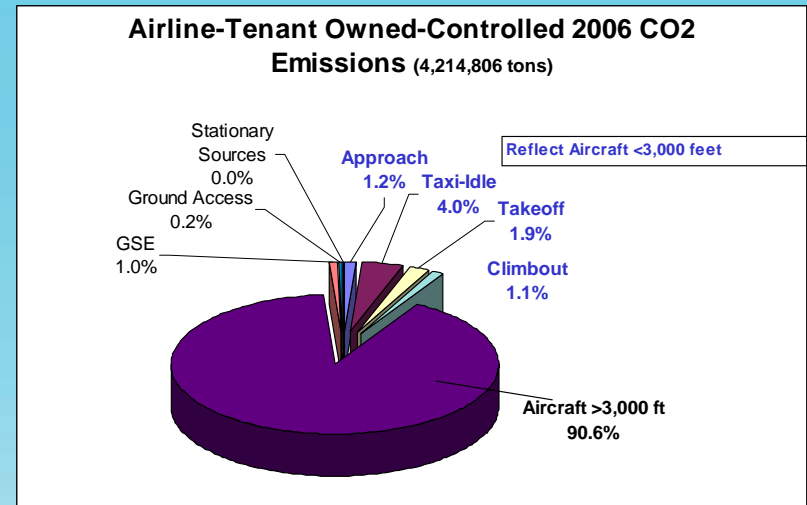
Public Owned-Controlled 2006 CO2 Emissions  
(373,033 tons)



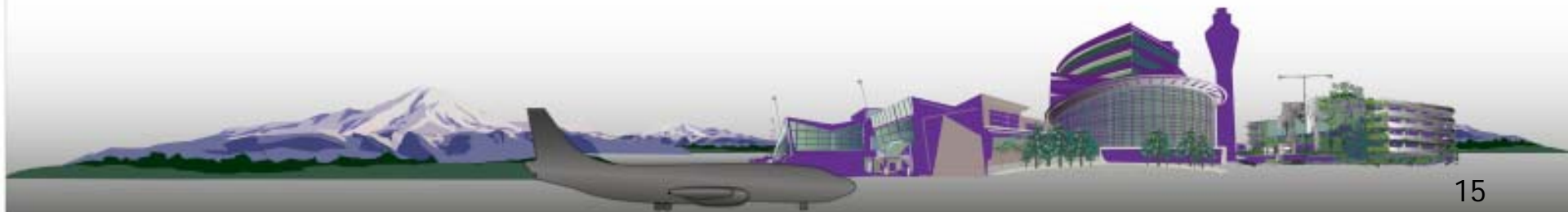
- Reduce single occupancy vehicles
- Green Rental Car Fleet
- Green Car Incentives
- Clean Fuel Service Vehicles
- Taxi Efficiencies



# Airline/Tenant Operations Emission Reduction Opportunities



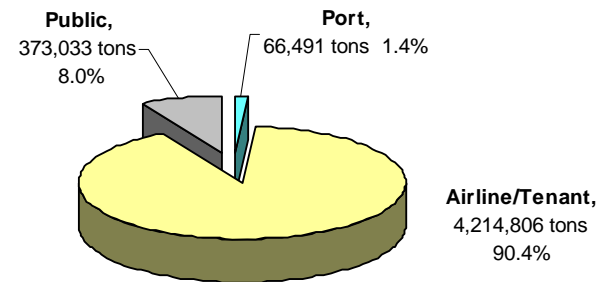
- Fuel Efficient Aircraft
- Pre-Conditioned Air to Gates
- Electric Ground Support Equipment
- Ramp Tower Efficiency
- Carbon Off-set Projects



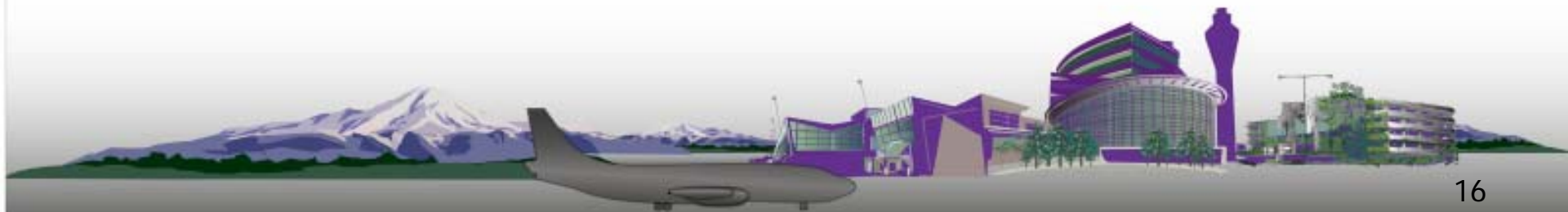
# Areas for Advocacy

## Emission Reduction Opportunities

**Distribution of Ownership/Control**  
(4,654,330 tons of CO<sub>2</sub> in 2006)



- International Aircraft Emission Standards
- Next Generation Air Traffic Improvements
- Continuous Descent Approach
- Single Engine Taxiing
- Regional Transit Improvements



# Thank You

